THE DATE BELOW EACH NUMERAL WILL SHOW WHEN THAT SECTION OF THE MAP WILL BE ON THE MERIDAN—DUE SOUTH—AT 9 P.M. OR AN HOUR EARLIER
FOR EACH NUMERAL WEST OF THIS DATE AND AN HOUR LATER FOR EACH NUMERAL EAST.
Nov. 5 Oct. 22 Oct. 5 Sept. 25 Sept. 5 Aug. 25 Aug. 5 July 25 July 5 June 25 June 5

The

Monthly Evening Sky Map

A SCIENTIFIC JOURNAL AND EDUCATIONAL GUIDE IN ASTRONOMY FOR THE AMATEUR

Founded in 1905 by Leon Barritt

ALSO A STAR, CONSTELLATION AND PLANET FINDER MAP ARRANGED FOR THE CURRENT MONTHS - MORNING AND EVENING - AND PRACTICAL ANYWHERE IN THE WORLD

PUBLISHED QUARTERLY

Largest Circulation of any Amateur Astronomical Journal in the World

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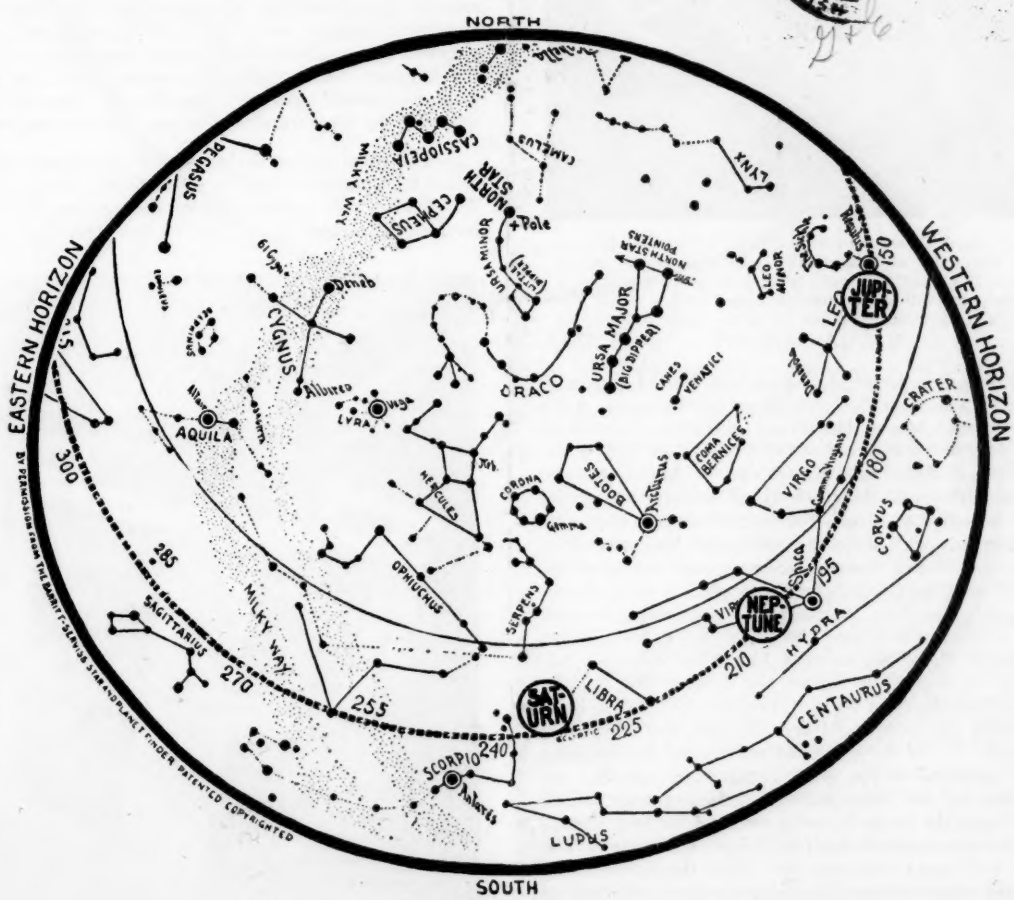
MINNESOTA
1956

EVENING SKY MAP FOR JULY



AT 9:30 P.M., JULY 1 **8:30 P.M., JULY 15** **7:30 P.M., JULY 31**

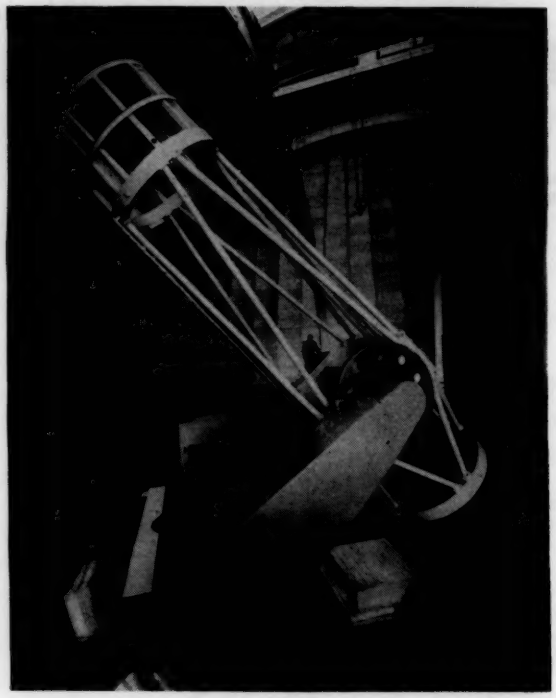
Face South and hold the Map overhead, the top North, and you will see the stars and planets just as they appear in the heavens. The arrow through the two stars in the bowl of the Big Dipper points to the North Star, the star at the end of the handle of the Little Dipper.

This map is arranged specifically for Latitude 40 North—New York—but is practical for ten or fifteen degrees north or south of this latitude anywhere in the United States, the southern portion of Canada and the northern portion of Mexico and for corresponding latitude in Europe.

XUM

THE WORLD'S SECOND LARGEST TELESCOPE

120 - INCH REFLECTOR
Nearing Completion for Lick Observatory



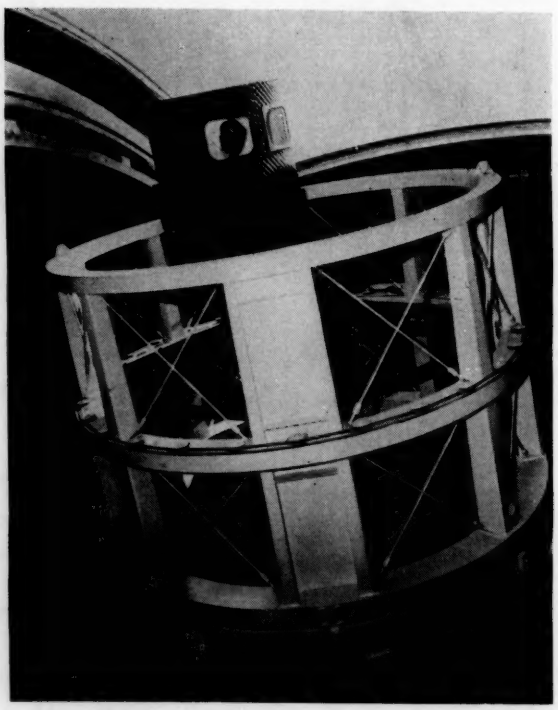
Photograph shows the nearly complete 120-inch telescope at the University of California's Lick Observatory, Mount Hamilton. The giant telescope, when it is put into operation later this year, will be the second largest in the world. The observer's cage is located at the top of the tube, at the prime focus.

A 120-inch reflecting telescope, the second largest in the world, is scheduled for completion late this year, at the Lick Observatory,Mount Hamilton, California. Capable of exploring the universe to a depth of 900 million light years, it will bring within sight the spectra of faint stars and stellar systems beyond the reach of all instruments but the 200-inch telescope at Mount Palomar. It dwarfs two other fine instruments with long and successful backgrounds at Lick, one the 36-inch Crossley reflector, and the other the famous Alvan Clark 36-inch refractor, used to such advantage by greats like Prof. Barnard. It is interesting to note that this new giant will have three auxiliary mirrors bigger than either of those two existing Lick telescopes—the following is the impressive list of the mirrors that will be installed eventually: two 50-inch; one 44-inch; one 36-inch; one 33-inch; one 30½-inch; one 31-inch; one 28½-inch; two 10-inch. All of these mirrors are needed for focusing the light gathered in the great 120-inch mirror. For example, three of the large mirrors including one 50-inch disc, will bring the image from the main mirror to a spectrograph. The spectrograph itself will have six mirrors. The telescope will begin with two foci: first, the *prime* focus, wherein the astronomer in the observer's cage at the end of the tube 50 feet away will work with the images formed by the 120-inch mirror directly; second, the *Coude* focus, which with the assistance of two secondary mirrors sends images to an observing point at the bottom of the polar axis. This second method has the big mirror operating at a focal ratio of f/35 and a focal length of 350 feet. Working at this focus, a photograph of the Moon would be over one yard in diameter, and the image recorded by Mars in September would approximate one-half inch in diameter! *Cassegrain* focus (f/15, through an 8-inch diameter hole in the center of the main mirror) will possibly be added later.

As pointed out by Dr. C. D. Shane, Director of Lick Observatory, a big need of astronomy today is to reach farther into space, and there are more problems in the distant heavens than the 200-inch Mount Palomar, and 100-inch Mount Wilson telescopes can cope with. Accordingly, a cooperative research program is being undertaken in order that science will get the greatest benefit from the world's three largest telescopes. This cooperation in planning has been in effect since 1946 when the California Legislature granted funds for the Lick telescope, at the request of Governor Warren.

The 120-inch blank itself and its grinding machine were bought from the California Institute of Technology, which operates the observatories at Mount Palomar and Mount Wilson. The blank, of pyrex glass, had been originally intended as a test instrument for the 200-inch mirror. However, other and better methods of testing were found, and the instrument lay in storage until the University of California bought it for $50,000. In addition, Lick has received the benefit of the Palomar experience in planning the telescope and grinding the mirror. And the grinding work was placed under the direction of Donald Hendrix, who did the final correction of the 200-inch mirror.

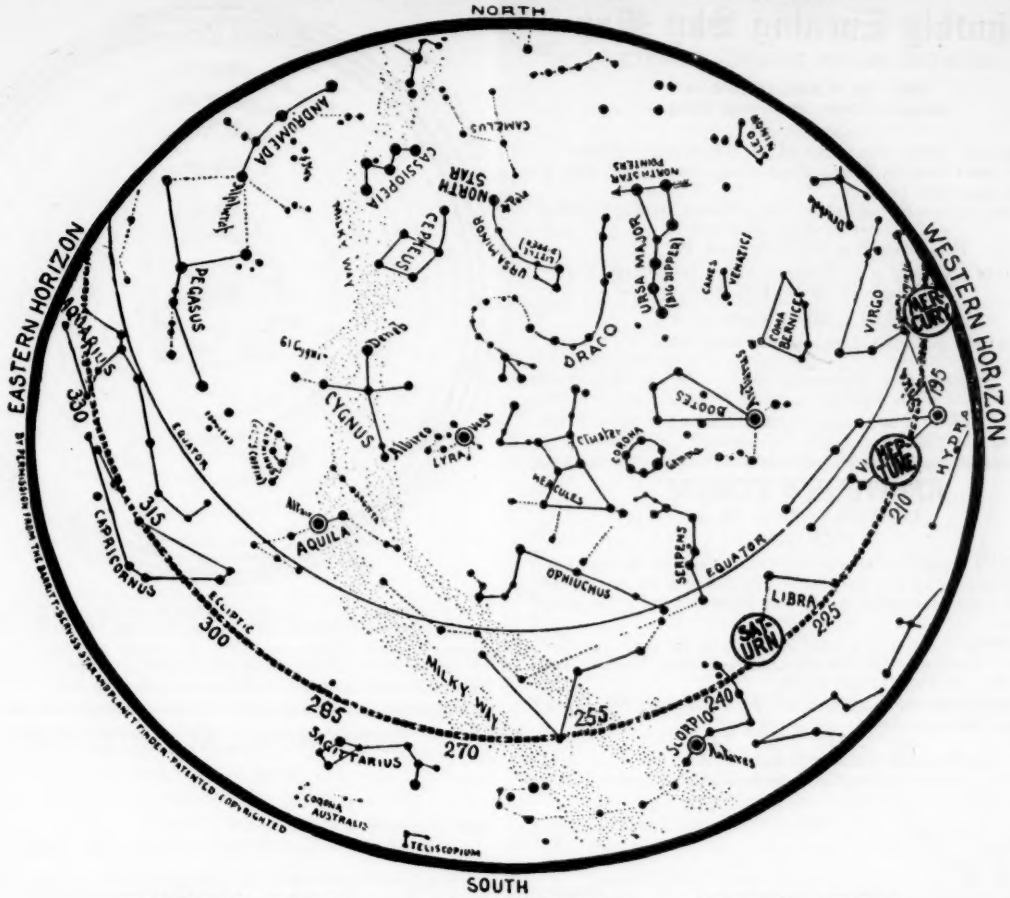
The conservative design of the instrument will make it one of the most versatile of telescopes. Designed by W. W. Bastian, the 53-foot tube of the new giant will carry its four-ton mirror in a huge 70 ton steel fork, the first



W. W. Baustian, engineer who executed the design on the 120-inch telescope at the University of California's Lick Observatory, in the observer's cage located at the prime focus. When using this focus, which is reached by an elevator, the observer rides high above the floor of the dome.

XUM

EVENING SKY MAP FOR AUGUST



AT 9:00 P.M., AUG. 1 8:00 P.M., AUG. 15 7:00 P.M., AUG: 31

Face South and hold the Map overhead, the top North, and you will see the stars and planets just as they appear in the heavens. The arrow through the two stars in the bowl of the Big Dipper points to the North Star, the star at the end of the handle of the Little Dipper. This map is arranged specifically for Latitude 40 North—New York—but is practical for ten or fifteen degrees north or south of this latitude anywhere in the United States, the southern portion of Canada and the northern portion of Mexico and for corresponding latitudes in Europe.

mounting of its kind on a large telescope. The whole sky, with the exception of that area five degrees from the horizon, can be covered. A motor in the hollow steel fork will drive the 35 ton tube and mirror, while another will rotate the fork. The dome of the telescope building, completed in 1952, has an outside diameter of 96 feet. An elevator is provided to carry astronomers to the prime focus cage at the top of the tube. Here the experimenter will ride in the telescope and be able to manipulate the instruments he will use in his observations. If the observer chooses, he can use the Coude focus, and will work in a room provided at the bottom (south end) of the polar axis.

Details of the grinding operations connected with producing the great 120-inch mirror reveal the magnitude of the undertaking. This work is being done in a special room beneath the observatory building. Rough grinding removed better than 600 pounds of glass from the disc. By the time the fine grinding, polishing, and final figuring are completed, upwards to 800 pounds of glass will have been removed. These operations are all very slow, and require scrupulous attention to detail. Dust can cause havoc; temperature changes must be avoided, to the end that operations had to be suspended during the winter of 1955-56 because suitable constant temperatures could not be maintained. Dr. Shane advises the "Map" that the mirror should be completed by mid-summer of this year. With a certain amount of mechanical work still to be done, the telescope can possibly be in operation by late fall. Therewith, science will obtain another powerful tool and make still one more major step forward.

COMET VISIBILITY

Comet activity can be summed up as follows:

Comet Mrkos (1956b), discovered as an 8th magnitude object, is now much fainter. Parabolic orbital elements reveal that perihelion passage occurred on April 13th at a point well within the earth's orbit. This comet is now receding rapidly from both the earth and the Sun.

Comet Wirtanen (1956c) appears destined to remain faint. According to announcements from the Harvard College Observatory, it will be closest to the Sun in August, 1957, and at the large perihelion distance of 4.45 astronomical units.

Comet Tcherepashtshuk (1956d) was discovered at the end of March as a 5th magnitude object among the Pleiades. We have no further details as we go to press.

Periodic Comet Tempel(2), originally discovered in 1873, has been found at this approach by G. Van Biesbroeck with the 82-inch McDonald Observatory telescope. Magnitude was 19. This comet, which circles the Sun in 5¼ years, comes to perihelion in 1957, but will be unfavorably placed.

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The

Monthly Evening Sky Map

FOUNDED IN 1905 BY LEON BARRITT

MRS. LEON BARRITT, Editor
Irving L. Meyer, Managing Editor

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All time is expressed in Eastern (75th Meridian) Standard Time. Add five hours to convert to Greenwich Civil Time.

AMATEUR'S FORUM

BY IRVING L. MEYER, M. S.

JULY 1956

THE SUN: opens the month in Gemini, close to its high point in the northern skies. The earth passes its *aphelion* on the 4th, and is then 94.5 million miles from the Sun. By month-end it has moved into Cancer.

THE MOON: makes its closest approach to the earth *(perigee)* the 8th at a distance of 222,000 miles, and is farthest from the earth *(apogee)* the 22nd at 252,000 miles.

Libration: Maximum exposure of the regions on the Moon's limbs takes place as follows:

July 2	East	limb, 7.4°
July 12	North	limb, 6.6°
July 15	West	limb, 7.7°
July 26	South	limb, 6.7°
July 31	East	limb, 7.2°

The Moon's Phases (E.S.T.):

Last Quarter	July 1 at 3:40 am
New Moon	7 at 11:37 pm
First Quarter	14 at 3:46 pm
Full Moon	22 at 4:29 pm
Last Quarter	30 at 2:31 pm

MERCURY: covers a pretty big arc of the sky, moving out of Taurus, through Gemini, Cancer, and into Leo. During this entire period, however, it is too close to the Sun to be observed. On the 19th it is in superior conjunction with the Sun and leaves the morning sky to enter the evening. On the 22nd it is farthest from the earth, at a distance of 125 million miles.

VENUS: moves in a small area of eastern Taurus, in the morning sky. Just past inferior conjunction with the Sun, it reappears rapidly in the morning, and by the end of the month can be observed easily before dawn. On the 28th it reaches greatest brilliancy (magnitude -4.2) and outshines any other star-like object in the heavens. It is then a very interesting telescopic object; its disc is large, 37" in diameter, and appears as a very thin crescent. Distance from the earth is now increasing—from 28 million miles the 1st to 43 million miles the 31st.

MARS: is not far below the equator in Aquarius, and well placed for observation in the late evening sky. For complete details, see separate article in this issue.

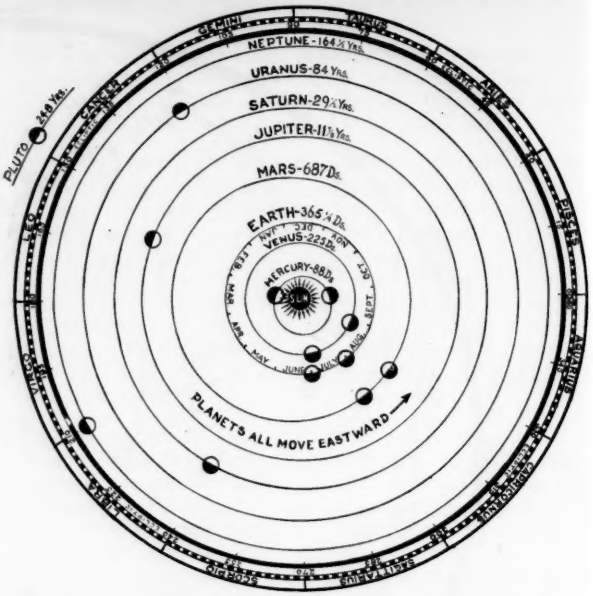
JUPITER: near Regulus in Leo, is in the evening sky but rather close to the Sun for really satisfactory observation. It is 572 million miles from the earth the 15th.

SATURN: is in Libra in the evening sky all month. It is well placed for observation. One of the most striking and interesting items in the field of astronomy, it is well suited for even small telescopes. On the 15th, the rings, which are widely opened, are 40" in diameter; magnitude is 0.6; and geocentric distance is 871 million miles.

URANUS: on the 25th this planet passes from the evening into the morning sky. Too close to the Sun the entire month to be observed, it hovers near *Praesepe* in Cancer. Maximum distance from the earth, the 25th, is 1819 million miles.

NEPTUNE: is observable in the evening sky in Virgo. It sets around midnight, but is not a very imposing object at best, as its magnitude is about 8. In the telescope, a power of about 100 diameters will show up its disc. Distance is very great—on the 15th, 2807 million miles.

HELIOCENTRIC POSITIONS OF THE PLANETS, JULY



The planets are shown in their respective orbits. Two positions, one for the first, and one for the last day of the month are given for Mercury, Venus, Earth, and Mars. The arrow indicates the last day of the month. Jupiter, Saturn, Uranus, Neptune, and Pluto are shown in their mean position for the current month.

ASTRONOMICAL CALENDAR

Eastern Standard Time

JULY 1956

July	2— 6:47 pm	Minimum of Algol
	3— 3:— pm	Conjunction, Mercury and Venus; Mercury north 3° 21'
	4— 8:— pm	Earth in aphelion
	5— 3.25 pm	Minimum of Algol
	6—12:12 pm	Conjunction, Venus and Moon; Venus south 3° 16'
	6—11:32 pm	Conjunction, Mercury and Moon; Mercury north 1° 44'
	8—11:— am	Mercury in ascending node
	8—12:24 pm	Minimum of Algol
	9— 1:59 am	Conjunction, Uranus and Moon; Uranus north 4° 55'
	9— 5:— pm	Neptune stationary in Right Ascension
	11— 2:26 am	Conjunction, Jupiter and Moon; Jupiter north 6° 33'
	11— 9:13 am	Minimum of Algol
	13— 2:— am	Mercury in perihelion
	13— 3:— pm	Venus stationary in Right Ascension
	14— 6:01 am	Minimum of Algol
	15— 5:04 am	Conjunction, Neptune and Moon; Neptune north 5° 15'
	17— 2:50 am	Minimum of Algol
	17— 9:45 am	Conjunction, Saturn and Moon; Saturn north 3° 5'
	17—Noon	Venus in aphelion
	19— 4:— pm	Superior conjunction, Mercury and Sun; Mercury north 1° 34'
	19—11:38 pm	Minimum of Algol
	20— 6:— am	Quadrature, Neptune and Sun
	22— 1:— am	Conjunction, Mercury and Uranus; Mercury north 1° 11'
	22— 8:27 pm	Minimum of Algol
	23— 9:— am	Mercury greatest heliocentric latitude north
	25—10:— am	Conjunction, Uranus and Sun
	25— 5:16 pm	Minimum of Algol
	27— 2:— am	Mars greatest heliocentric latitude south
	27— 9:28 am	Conjunction, Mars and Moon; Mars south 10° 59'
	28— 2:04 pm	Minimum of Algol
	28— 7:00 pm	Venus, greatest brilliancy
	31— 5:— am	Saturn stationary in Right Ascension
	31—10:53 am	Minimum of Algol

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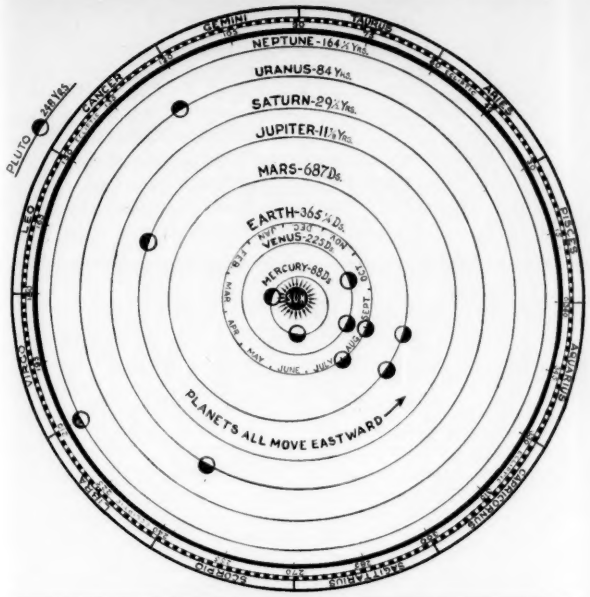
HELIOCENTRIC POSITIONS OF THE PLANETS, AUGUST



THE PERSEID METEOR SHOWER

The wonderful annual meteor shower known as the Perseids should put on an excellent display this year. The Moon often has a habit of turning up full at this time, and with its bright rays seriously dimming the shower. This year, however, the Moon will have set by midnight, so that from then till dawn—the time when meteors are most frequent—there will be no impediment. This shower reaches a maximum on the 11th and 12th of August, with the trails radiating from the constellation Perseus.

ASTRONOMICAL CALENDAR

Eastern Standard Time

AUGUST 1956

August	3— 7:40 am	Conjunction, Venus and Moon; Venus
	3— 7:41 am	Minimum of Algol
	5— 3:30 pm	Conjunction, Uranus and Moon; Uranus north 5° 0'
	6— 4:30 am	Minimum of Algol
	7— 5:24 pm	Conjunction, Mercury and Moon; Mercury north 6° 30'
	7— 9:34 pm	Conjunction, Jupiter and Moon; Jupiter north 6° 27'
	8— 6:— pm	Venus greatest heliocentric latitude south
	9— 1:18 am	Minimum of Algol
	9— 1:— pm	Conjunction, Mercury and Jupiter; Mercury south 0° 10'
	11—12:49 pm	Conjunction, Neptune and Moon; Neptune north 4° 58'
	11— 1:— pm	Mars stationary in Right Ascension
	11—10:07 pm	Minimum of Algol
	13— 4:05 pm	Conjunction, Saturn and Moon; Saturn north 2° 45'
	14— 6:55 pm	Minimum of Algol
	15— 7:— pm	Mercury in descending node
	17— 3:44 pm	Minimum of Algol
	19— 7:— am	Quadrature, Saturn and Sun
	20—12:33 pm	Minimum of Algol
	21— 5:— am	Conjunction, Pluto and Sun
	21—11:— am	Mars in perihelion
	23— 9:21 am	Minimum of Algol
	23— 4:05 pm	Conjunction, Mars and Moon; Mars south 11° 47'
	26— 2:— am	Mercury in aphelion
	26— 6:10 am	Minimum of Algol
	29— 2:58 am	Minimum of Algol
	31—12:— am	Mercury greatest elongation east, 27° 13'
	31— 1:— pm	Venus greatest elongation west, 45° 55'
	31—11:47 pm	Minimum of Algol

SATELLITES OF JUPITER

JULY

Day	West									East
1	·4			1·	○	·2 ·3				
2		·4		3·	○	1· 2·				
3			·4 ·1	2· ·1	○					
4				·3 ·4 ·2	○	·1				
5					○	·4	·2			·1 ● ·3 ●
6					1·	○	2·	·4 ·3		
7				2·		○	·1	3·	·4	
8				1·		○	3·		·4	·2 ●
9				3·		○	1· 2·		4·	
10			3·		·1 ·2	○			4·	
11			·3	·2		○	1·		4·	
12						○	·3 ·1	·2 4·		
13	○ 1·				4	○	2·	·3		
14				2· ·4		○	·1	3·		
15			4·		1·	○	3·			·2 ●
16		4·			3·	○	·1 2·			
17	4·		3·		·1 2·	○				
18		·4		·3 ·2		○	1·			
19			·4		·3 ·1	○	·2			
20	○ 1·			·4		○	2· ·3			
21				2· ·4		○		·3		·1 ●
22					1· ·2	○	·4	3·		
23					3·	○	·1	·2 ·4		
24	○ 2·			3·	1·	○			·4	
25				·3	·2	○	1·			·4
26					·3 ·1	○	·2			4·
27						○	1·	·3 ·2	4·	
28				2·		○		·3	4·	·1 ●

Appearance of Jupiter and its satellites at 9:30 P.M., E.S.T. as seen in an inverting telescope

Jupiter is represented by the disc in the center of the chart, and each satellite by a dot and its appropriate number. The direction of the satellite's motion is from the dot toward the numeral. The numeral and light disc at the left margin of the chart indicates a satellite in transit across Jupiter's disc; the numeral and dark disc at the right margin indicates a satellite which is invisible because it is being eclipsed or occulted by Jupiter. This chart must be held upside down if binoculars, opera glasses, or an erecting type telescope is used.

Because of Jupiter's nearness to the Sun, the charts of satellites are omitted for the period July 29th to September 20th.

SATELLITES OF JUPITER

SEPTEMBER

Day	West								East
21			4· ·3	1· ·2	○				
22		4·		·3	○	1· ·2			
23	4·			·1	2	○	·3		
24		·4		·2		○	1·	·3	
25			·4			○	·2	3·	
26	○ 1·			·4		○	3·	2·	
27				3·	·4 ·2	○	·1		
28			·3		·2 ·1	○	·4		
29				·3		○	·1	·2 ·4	
30					·1	○	·3 ·2		·4

Appearance of Jupiter and its satellites at 6:15 A.M., E.S.T. as seen in an inverting telescope

Your address, as printed on the mailing wrapper, contains your expiration information—the first digit is the *issue number*, followed by the year. For example, "2-57" means that the last issue of the subscription would be the second (April-May-June) of 1957. If there is any discrepancy in expiration, or address, kindly advise.

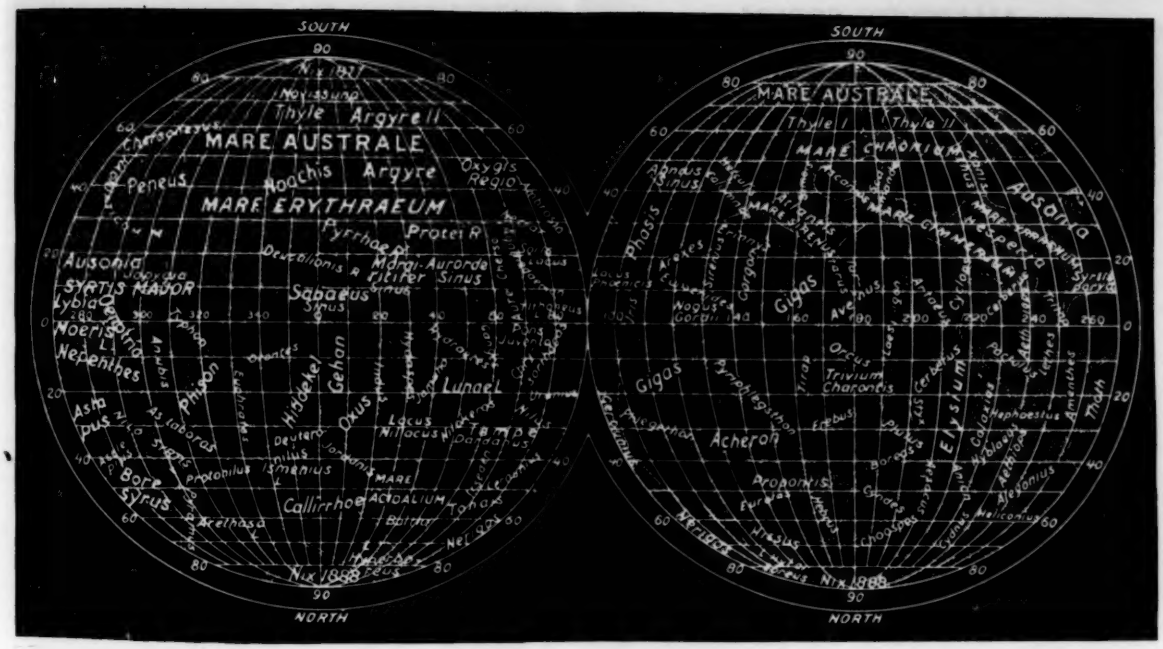
XUM

MARS—NOTES AND OBSERVING DATA

When Mars reaches heliocentric longitude 335° on its path around the Sun, it has reached the point in its orbit closest to the Sun. If the earth should be at longitude 335° at the same time the two planets would be about as close together as they could come — a minimum distance of 34,615,000 miles. At this time, however, Mars is 1° 47' south of the earth's orbit as seen from the Sun which, from the earth, puts this planet better than 6° south of the ecliptic. Accordingly, when closest to the earth at the most favorable oppositions it must be pretty far south of the equator and favoring observers in the southern hemisphere The closest opposition would have to occur on about August 28th, when the earth, too, is at longitude 335°. This year, opposition occurs on September 10th and puts Mars in a very favorable position for observation from the northern hemisphere, as it is only 10° south of the equator. Contrast this with the close approach of July, 1939, when Mars reached a point a shade over 36 million miles from the earth, but was 27° south of the equator. By contrast, too, the 1941 opposition of October put the planet north of the equator, but at 38 million miles it was smaller in apparent diameter and brightness. So we come to this opposition,

TABLE OF PHYSICAL DATA OF MARS, 1956

Date (7:00 pm E.S.T.)	Magnitude	Diameter	Amount of disc illuminated	Inclination of SOUTH pole toward: Earth	Sun	Longitude at center of disc	Distance from earth (millions of miles)	Time of Transit (75th meridian)
July 2	-1.0	15.33"	.879	20.86°	13.73°	218°	56.72	4:27 am
4	-1.1	15.63	.882	20.83	14.15	199		
6	-1.1	15.93	.884	20.80	14.57	180		
8	-1.2	16.24	.887	20.75	14.98	161	53.56	4:13 am
10	-1.2	16.55	.890	20.70	15.38	142		
12	-1.3	16.87	.893	20.64	15.77	123		
14	-1.3	17.20	.896	20.58	16.16	104	50.56	3:58 am
16	-1.4	17.54	.899	20.51	16.54	85		
18	-1.4	17.87	.903	20.44	16.92	66		
20	-1.5	18.21	.906	20.36	17.29	47	47.74	3:41 am
22	-1.6	18.56	.910	20.28	17.65	29		
24	-1.6	18.91	.914	20.20	18.00	10		
26	-1.7	19.27	.918	20.11	18.35	351	45.12	3:23 am
28	-1.7	19.63	.922	20.03	18.69	333		
30	-1.8	19.99	.926	19.94	19.02	314		
Aug. 1	-1.8	20.35	.931	19.86	19.34	296	42.72	3:04 am
3	-1.9	20.71	.935	19.77	19.65	277		
5	-1.9	21.07	.940	19.69	19.95	259		
7	-2.0	21.43	.945	19.61	20.24	241	40.58	2:43 am
9	-2.0	21.78	.949	19.54	20.52	222		
11	-2.1	22.12	.954	19.47	20.80	204		
13	-2.1	22.45	.959	19.40	21.06	186	38.73	2:20 am
15	-2.2	22.77	.963	19.35	21.32	168		
17	-2.2	23.07	.968	19.29	21.56	150		
19	-2.3	23.36	.972	19.25	21.79	132	37.23	1:55 am
21	-2.3	23.63	.976	19.21	22.01	114		
23	-2.4	23.87	.980	19.18	22.22	96		
25	-2.4	24.09	.984	19.16	22.42	78	36.09	1:28 am
27	-2.5	24.28	.987	19.14	22.61	61		
29	-2.5	24.45	.990	19.14	22.79	43		
31	-2.6	24.58	.992	19.14	22.95	25	35.38	1:00 am
Sept. 2	-2.6	24.67	.994	19.15	23.10	8	35.24	
4	-2.6	24.73	.996	19.17	23.24	350	35.16	
6	-2.6	24.76	.997	19.20	23.37	332	35.12	12:30 am
8	-2.6	24.74	.998	19.24	23.49	315	35.14	
10	-2.6	24.69	.999	19.29	23.59	297	35.22	
12	-2.6	24.60	.998	19.35	23.68	279	35.35	12:01 am
14	-2.6	24.47	.997	19.42	23.76	262		
16	-2.6	24.31	.996	19.50	23.83	244		
18	-2.5	24.11	.995	19.58	23.89	226	36.06	11:25 pm
20	-2.5	23.88	.993	19.67	23.93	209		
22	-2.4	23.63	.990	19.77	23.96	191		
24	-2.4	23.35	.988	19.88	23.98	173	37.25	10:56 pm
26	-2.3	23.04	.984	20.00	23.99	155		
28	-2.3	22.71	.981	20.13	23.98	137		
30	-2.2	22.36	.977	20.26	23.96	119	38.88	10:28 pm
Oct. 2	-2.2	22.00	.974	20.39	23.93	101		
4	-2.1	21.62	.970	20.54	23.89	83		
6	-2.0	21.24	.965	20.69	23.84	65	40.94	10:02 pm
8	-2.0	20.84	.961	20.84	23.77	47		
10	-1.9	20.44	.957	21.00	23.69	29		
12	-1.8	20.44	.953	21.17	23.60	11	43:39	9:38 pm
14	-1.8	19.64	.948	21.34	23.50	352		
16	-1.7	19.23	.944	21.51	23.39	334		
18	-1.7	18.83	.940	21.68	23.27	316	46.18	9:15 pm
20	-1.6	18.43	.936	21.85	23.14	297		
22	-1.5	18.04	.932	22.03	22.99	279		
24	-1.5	17.65	.928	22.21	22.84	260	49.27	8:54 pm
26	-1.4	17.26	.924	22.38	22.67	241		
28	-1.3	16.89	.920	22.56	22.50	223		
30	-1.3	16.52	.917	22.73	22.31	204	52.64	8:34 pm
Nov. 1	-1.3	16.16	.914	22.90	22.12	185		
3	-1.2	15.80	.911	23.07	21.91	166		
5	-1.1	15.45	.908	23.23	21.70	147	56.27	8:16 pm
7	-1.0	15.11	.905	23.39	21.48	129		



HEMISPHERIC MAP OF MARS

Showing the principle surface features, including the more prominent canals, together with the adopted system of Martian latitude and longitude.

with Mars very nearly as close to our world as it can come, and still not too far below the equator. Why don't we in the northern hemisphere want the planet too far south of the equator? Mars at best presents a relatively small disc in the telescope. The higher it rides in the sky—that is, the closer to the zenith when we observe it—the less boiling of the atmosphere and, consequently, the finer the detail that will be visible in the telescope.

PHOTOGRAPHS OF MARS

A good representation of its appearance in a moderate-sized telescope.

In 1659, Huyghens made the first drawing of Mars, one, which though very crude and lacking in detail, revealed the familiar outlines of the *Syrtis Major*. Since that day, improved telescopes have enabled observers to establish the permanency of this and other surface markings, including the famous *Canals* and the polar caps. This year, as is evident from our table of Physical Data, summer arrives at Mars, southern hemisphere on about September 26th, on which date its south pole is inclined most toward the Sun. During all our summer months, however, this pole is inclined greatly toward the earth, and the polar cap should be readily visible in a six inch or even smaller telescope. The polar caps normally shrink rapidly during Martian summer, so by October it will probably be greatly diminished in size.

Observers will be able to identify other Martian markings by reference to the Hemispheric map of the surface. The longitude of the center of the disc can be determined from our Table of Physical Data by adding to the given longitude an amount of about 14.6° per hour after 7:00 pm E.S.T. of the appropriate date. The canals are difficult to see, but have been picked out by observers using moderate equipment, depending on atmospheric conditions. A magnification of no less than 100 diameters should be employed at all times. This, at opposition, will make Mars appear half again as large as does the Moon to our unaided eye. Obviously, considerable detail should then be seen.

TWO DRAWINGS OF MARS MADE DURING THE OPPOSITION OF 1924

Left: by William Henry, showing the funnel-shaped Syrtis Major, longitude 280°; right, by William Pickering, showing the Solis Lacus and Mare Sirenus.

XUM

AMATEUR'S FORUM

BY IRVING L. MEYER, M. S.

AUGUST 1956

THE SUN: moves from Cancer into Leo, and is heading southward at a faster pace. It is 94.3 million miles from the earth the 1st, and on the 31st is 93.8 million miles.

THE MOON: is at perigee the 5th at 222,000 miles, and is at apogee the 18th at 252,00 miles.

Libration: Maximum exposure of the regions on the Moon's limbs takes place as follows:

August 8 North limb, 6.5°
August 12 West limb, 7.8°
August 22 South limb, 6.6°
August 28 East limb, 6.2°

The Moon's Phases (E.S.T.):

New Moon	August	6 at 6:25 am
First Quarter		13 at 3:45 am
Full Moon		21 at 7:38 am
Last Quarter		28 at 11:13 pm

MERCURY: crosses the constellation Leo during the month, and moves well into Virgo. On the 31st it reaches greatest elongation east of the Sun, in the evening sky, at 27° 13'. The best time to sight Mercury is for a few days before and after this date. It will be observable low in the west, in the twilight zone, and its magnitude will be 0.4. Following Mercury at a little over 15 degrees distance is Spica, which should serve as a guide. Mercury will be almost a magnitude the brighter, and will show up between Spica and the bright glow on the horizon left by the setting Sun. On the 1st it is 121 million miles from the earth; by the 31st this gap has been narrowed to 87 million miles.

VENUS: is in the morning sky, well placed for any observer who will arise in the pre-dawn hours to see this brilliant planet in the east. It moves from the edge of Taurus through a large part of Gemini, and is particularly well placed for observers in the northern hemisphere. Though it is receding from the earth (44 million miles the 1st against 65 million miles the 31st) brightness hardly varies as more and more of the surface appears illuminated from the earth. It will appear crescent-shaped in the telescope all month. On the 31st, the same day Mercury is at greatest elongation from the Sun in the evening sky, Venus arrives at greatest elongation in the morning sky.

MARS: a brilliant spectacle in the night sky in Aquarius. For complete details, see separate article elsewhere in this issue.

JUPITER: moves slowly through Leo, remaining in the evening sky all month. It is, however, too close to the Sun for worthwhile observation. Distance from the earth the 15th is 593 million miles.

SATURN: holds forth in the evening sky, setting around midnight from a location in Libra. It is very interestingly placed, not far north-west of the ruddy star, Antares. Saturn is an ideal telescopic study, with its unique ring system, satellites, and cloud-banded disc. It is 916 million miles from the earth the 15th.

URANUS: is in Cancer in the morning sky. It is too close to the Sun all month to be observed satisfactorily. Magnitude is 6, putting it close to the borderline of naked-eye visibility. Distance the 15th is 1813 million miles.

NEPTUNE: another very remote giant (2854 million miles away the 15th) and very faint. At magnitude 8 it can be seen with very small telescopes or even binoculars, but it is uninteresting. In Virgo in the evening sky, it sets well before midnight.

AMATEUR'S FORUM

BY IRVING L. MEYER, M. S.

SEPTEMBER 1956

THE SUN: passes to the southern side of the equator on the 22nd, as its path takes it from Leo into Virgo. It is 93.7 million miles from the earth the 1st, decreasing slightly to 93.0 million miles by the 30th.

THE MOON: makes two close approaches to the earth this month; the first on the 2nd at 224,000 miles and the second on the 30th at 227,000 miles. Its most distant point is reached the 15th at 252,000 miles.

Libration: Maximum exposure of the regions on the Moon's limbs takes place as follows:

September 4 North limb, 6.5°
September 9 West limb, 7.2°
September 18 South limb, 6.6°
September 24 East limb, 5.0°

The Moon's Phases (E.S.T.)

New Moon	September	4 at 1:57 pm
First Quarter		11 at 7:13 pm
Full Moon		19 at 10:19 pm
Last Quarter		27 at 6:25 am

MERCURY: moves in a small area of Virgo, commencing the month as an evening star but on the 26th entering the morning sky. It is visible in the western evening sky for the first few days of the month, being visible low in the west just after sunset. After this period it moves rapidly between the Sun and Earth. On the first of the month its disc will be about 7" in diameter and will look much like the Moon at quarter phase; distance is 86 million miles. It is closest to the earth the 24th at 60 million miles.

VENUS: travels from the eastern edge of Gemini, through Cancer, into Leo. In the morning sky, it will be a brilliant companion to Regulus at month-end. In the telescope it will appear gibbous, and will average magnitude -3.8. Anybody who observes Venus before daybreak will have no trouble following the planet with the naked-eye as dawn breaks and the Sun rises. In fact, this planet can be seen without optical aid at high noon if the observer knows exactly where to look. Distance increases from 66 to 86 million miles during the month.

MARS: is retrograding in Aquarius, making its closest approach to the earth the 7th, and coming to opposition on the 10th. Very favorably placed for observation. See separate article elsewhere in this issue for complete details.

JUPITER: is in conjunction with the Sun on the 4th, and thereupon enters the morning sky. Too close to the Sun all month for observation. It is farthest from the earth the 4th at 597 million miles.

SATURN: still readily observable in the early evening sky, in the Libra-Scorpio area. It will appear a little brighter than its near neighbor, Antares. Its period of visibility at this opposition is drawing to a close rapidly. Distance the 15th is 963 million miles.

URANUS: is in the morning sky in Cancer. While it now is in position for observation, it is still not a very interesting sight. It is in conjunction with Venus on the 14th, but the latter is 2° 15' south of Uranus and therefore, rather too far to serve as a guide in identifying Uranus. Distance from the earth the middle of the month is 1786 million miles; magnitude is 6.

NEPTUNE: in Virgo in the evening sky, shines as a faint star of magnitude 8. It is no longer well placed for observation, and at the slow pace it moves eastward, it will be swallowed in the rays of the Sun, shortly. Distance from the earth the 15th is 2891 million miles.

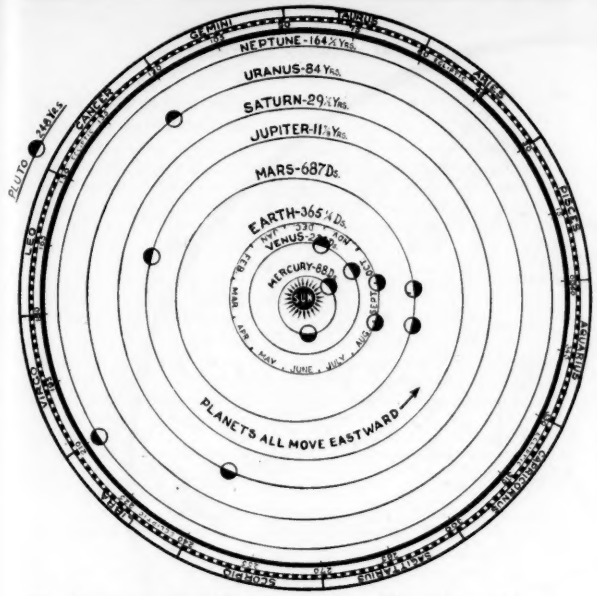
ASTRONOMICAL CALENDAR

Eastern Standard Time

SEPTEMBER 1956

Sept.	1— 7:29 am	Conjunction, Venus and Moon; Venus north 1° 8'
	2— 4:09 am	Conjunction, Uranus and Moon; Uranus north 5° 12'
	3— 8:35 pm	Minimum of Algol
	4—11:— am	Conjunction, Jupiter and Sun
	4— 5:49 pm	Conjunction, Jupiter and Moon; Jupiter north 6° 22'
	6—12:19 pm	Conjunction, Mercury and Moon; Mercury north 0° 45'
	6— 5:24 pm	Minimum of Algol
	7—12:— am	Mars nearest earth
	7—10:52 pm	Conjunction, Neptune and Moon; Neptune north 4° 40'
	9— 2:13 pm	Minimum of Algol
	10— 2:01 am	Conjunction, Saturn and Moon; Saturn north 2° 16'
	10— 5:— pm	Opposition, Mars and Sun
	12—11:01 am	Minimum of Algol
	13— 3:— am	Mercury stationary in Right Ascension
	14— 1:— am	Conjunction, Venus and Uranus; Venus south 2° 15'
	15— 7:50 am	Minimum of Algol
	15—10:— am	Mercury greatest heliocentric latitude south
	18— 4:38 am	Minimum of Algol
	19— 9:02 am	Conjunction, Mars and Moon; Mars south 11° 6'
	21— 1:27 am	Minimum of Algol
	22— 8:36 pm	Sun enters *sign* of Libra; Equinox
	23—10:16 pm	Minimum of Algol
	26— 8:— am	Inferior conjunction, Mercury and Sun; Mercury south 2° 38'
	26— 7:04 pm	Minimum of Algol
	29— 2:18 pm	Conjunction, Uranus and Moon; Uranus north 5° 27'
	29— 3:53 pm	Minimum of Algol
	30— 8:51 pm	Conjunction, Venus and Moon; Venus north 5° 9'

HELIOCENTRIC POSITIONS OF THE PLANETS, SEPTEMBER



The planets are shown in their respective orbits. Two positions, one for the first, and one for the last day of the month are given for Mercury, Venus, Earth, and Mars. The arrow indicates the last day of the month. Jupiter, Saturn, Uranus, Neptune, and Pluto are shown in their mean position for the current month.

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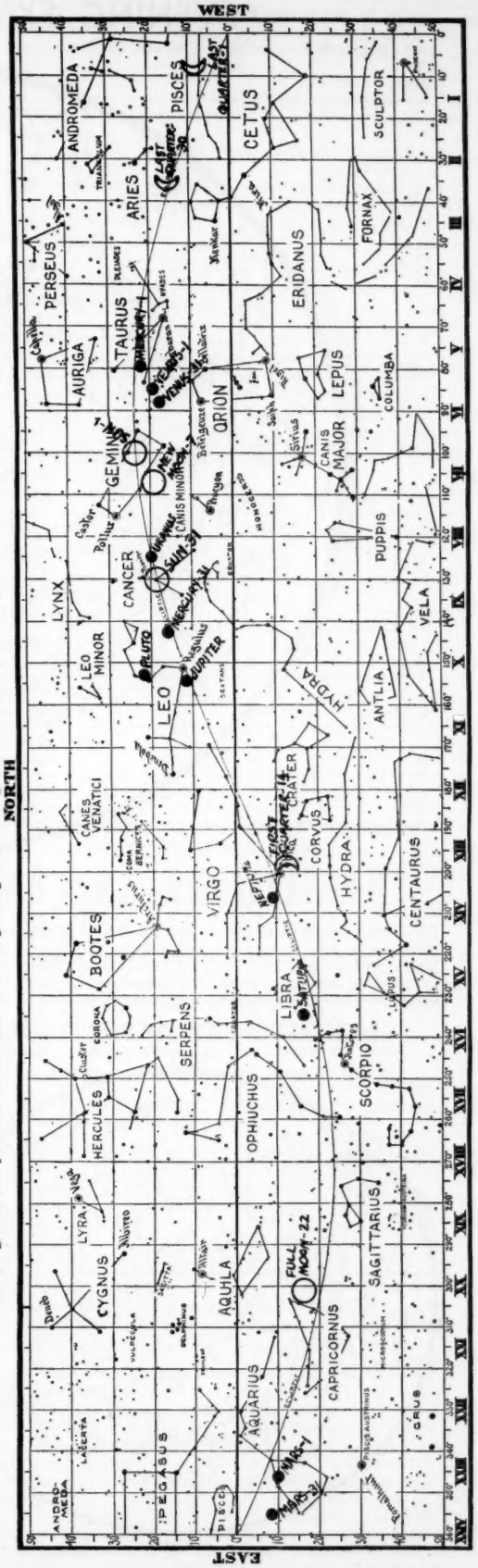
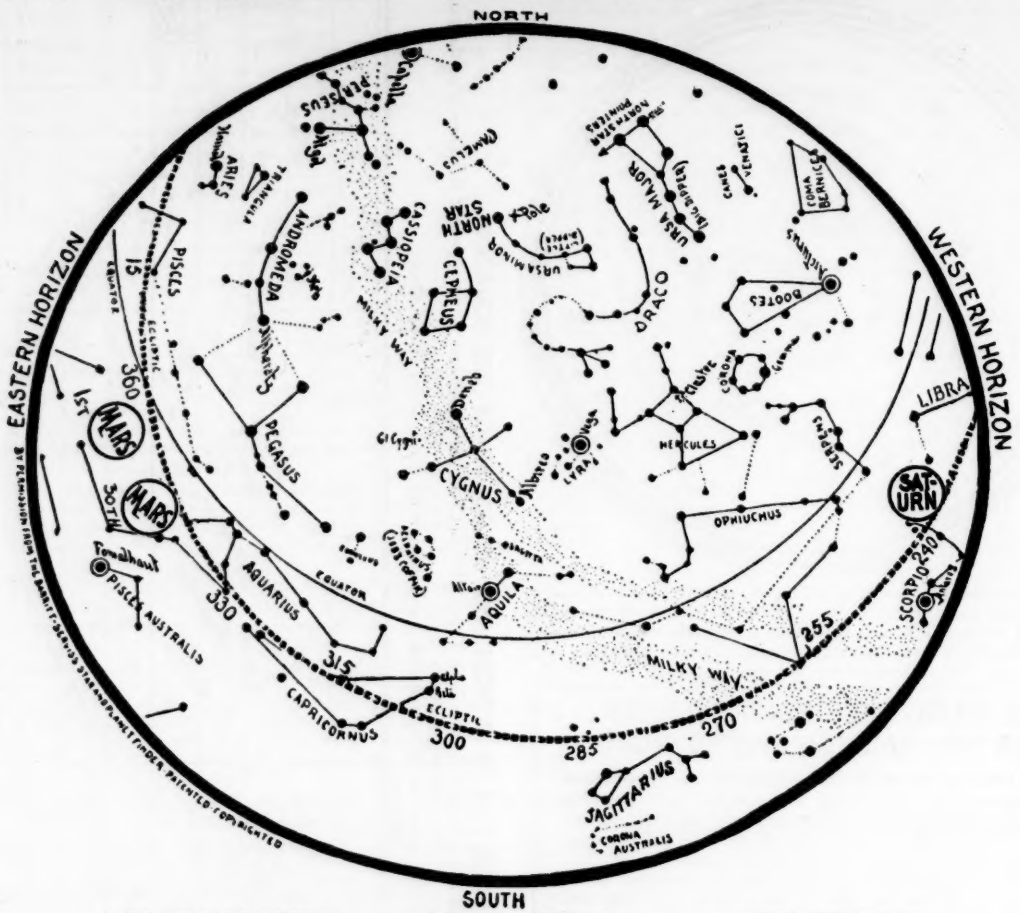


EVENING SKY MAP FOR SEPTEMBER



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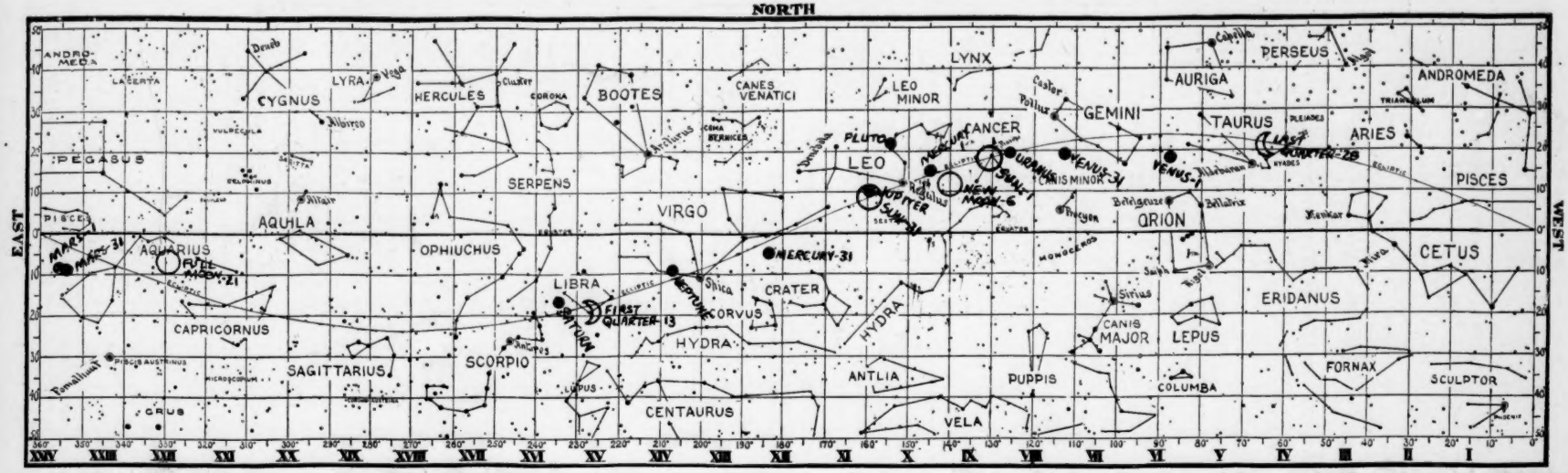

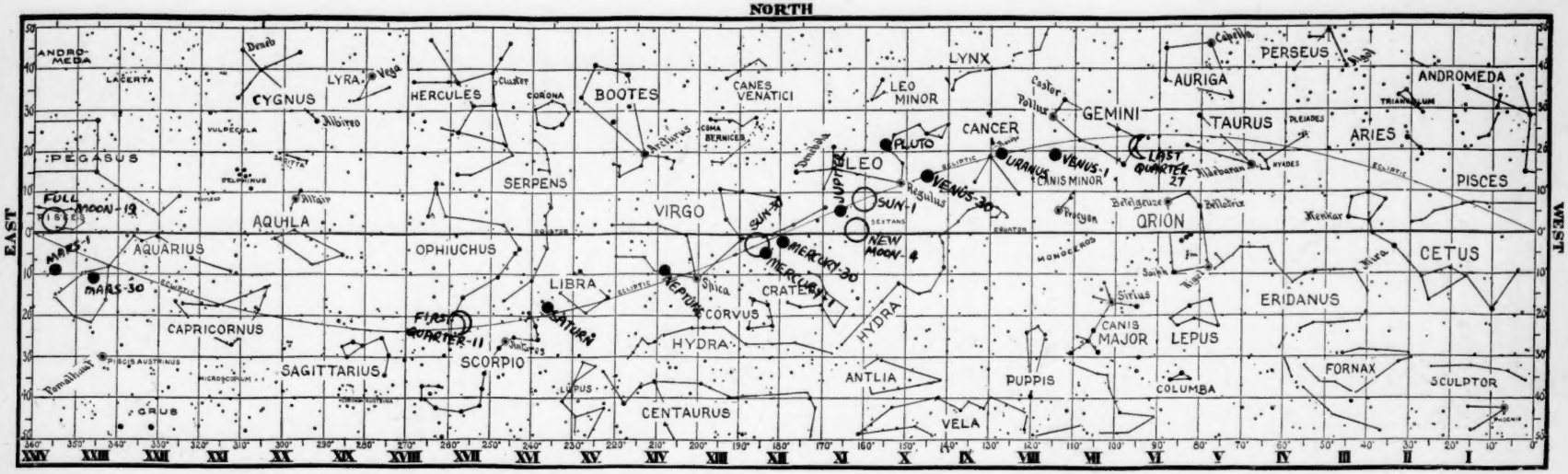

Nov. 5 Oct. 22 Oct. 5 Sept. 20 Sept. 5 Aug. 20 Aug. 5 July 20 July 5 June 20 June 5 May 20 May 5 Apr. 20 Apr. 5 Mar. 20 Mar. 5 Feb. 18 Feb. 2 Jan. 20 Jan. 5 Dec. 20 Dec. 5 Nov. 20

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